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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOSEPH C. KOPCHICK, MARK A. OSBORNE,
and RICHARD D. RICCHI

Appeal 2016-002875
Application 13/609,821¹
Technology Center 1700

Before DONNA M. PRAISS, JULIA HEANEY, and
MICHAEL G. McMANUS, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL²

¹ Appellant identifies GM Global Technology Operations LLC as the real party in interest. App. Br. 1.

² In this decision, we refer to the Specification filed Sept. 11, 2012 (“Spec.”), the Final Office Action mailed Feb. 13, 2015 (“Final Act.”), the Appeal Brief filed June 23, 2015 (“App. Br.”), the Examiner’s Answer mailed Nov. 19, 2015 (“Ans.”), and the Reply Brief filed Jan. 19, 2016 (“Reply Br.”).

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner’s final decision to reject claims 1–18 as obvious under 35 U.S.C. § 103(a) over Ozawa,³ Grassi,⁴ Buschkamp,⁵ Rasmussen,⁶ and other references. App. Br. 4–5; Final Act. 2–11.

We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The subject matter on appeal relates to “methods for casting engine components, and more particularly to an advanced aluminum-based diesel piston with complex features and a method casting the same.” Spec. ¶ 2. Claim 1 is illustrative (disputed matter italicized):

1. A method of *sand casting an aluminum-based piston for a light-duty or medium-duty diesel engine*, the method comprising:

providing a pattern for the piston, the pattern including a dome and a reentrant bowl;

forming a piston mold around the pattern, the mold comprising an aggregate material and a binder;

removing the pattern from the piston mold;

introducing molten aluminum-based metal into the piston mold;

contacting the piston mold with a solvent for the binder and removing the binder and the aggregate; and

cooling the molten aluminum-based metal such that upon solidification, and *without post-cast processing of the piston*, the piston substantially defines the dome and the reentrant bowl that

³ Ozawa, US 5,595,145, iss. Jan. 21, 1997 (“Ozawa”).

⁴ Grassi et al., US 7,121,318 B2, iss. Oct. 17, 2006 (“Grassi”).

⁵ Buschkamp, US 2011/0203545 A1, pub. Aug. 25, 2011 (“Buschkamp”).

⁶ Rasmussen, US 2008/0034961 A1, pub. Feb. 14, 2008 (“Rasmussen”).

can withstand an operating pressure up to about 200 bar cylinder pressure and a temperature up to about 400 degrees Celsius.

App. Br. 10 (Claims App'x).

OPINION

The Examiner finds that claims 1–18 would have been obvious to one of ordinary skill in the art at the time of the invention for the reasons stated on pages 3–11 of the Final Action.

Appellants do not separately argue the patentability of claims 1–18. App. Br. 5–8. In accordance with 37 C.F.R. § 41.37(c)(1)(iv), and based upon the lack of arguments directed to the subsidiary rejections, claims 2–18 will stand or fall together with independent claim 1.

Appellants argue that the Examiner erred in rejecting the independent claims (1 and 13) because “an improved casting process for aluminum-based pistons cannot be achieved by the combination of [Ozawa,] Grassi, Buschkamp, and Rasmussen.” App. Br. 5. Appellants do not dispute the Examiner’s findings as to Ozawa, Grassi, or Buschkamp, nor do Appellants dispute the Examiner’s finding that the combination of Ozawa, Grassi, and Buschkamp is “silent regarding the claimed limitation that the casting is accomplished without post-cast processing.” *Id.* at 5–6. Appellants contend that “one would not seek recourse to the teachings of Rasmussen” because “Rasmussen clearly teaches that the use of aluminum and sand casting is unlikely to be productive of the result sought by Rasmussen and the present invention.” *Id.* at 7. According to Appellants, “Rasmussen repeatedly emphasizes in paragraphs [0017] through [0019] that aluminum-based alloys are unsuitable for use as pistons for internal combustion engines (including diesel engines)” (*id.* at 6) and “Rasmussen repeatedly teaches away from the use of the claimed material of choice (aluminum) and sand casting” (*id.* at

7). Appellants further contend that “the combination of Ozawa, Grassi, and Buschkamp produces methods that are at odds with that intended in Rasmussen” amounting to “impermissible lack of motivation.” *Id.* at 8.

The Examiner responds that Rasmussen’s discussion of prior art methods having not been entirely satisfactory from either a weight or strength standpoint is not “a blanket statement that aluminum or aluminum alloys are entirely impossible to be used for diesel engine pistons.” Ans. 2–3. The Examiner notes that Rasmussen teaches “the standard for IC [internal combustion] pistons for over 60 years has been an aluminum piston.” *Id.* at 3 (citing Rasmussen ¶ 15). The Examiner further finds that Rasmussen does not teach against utilizing aluminum or aluminum alloys in a casting method, but, rather, teaches that after being cast the object would eventually fail, which is different from failing during casting. *Id.* The Examiner also finds that Rasmussen does not teach away from the use of sand casting, but rather promotes it. *Id.* (citing Rasmussen ¶ 49). In addition, the Examiner finds that the combination of references relates to sand casting overall. *Id.*

In the Reply Brief, Appellants repeat their argument that paragraphs 17 through 19 of Rasmussen “repeatedly highlights . . . that aluminum-based alloys are unsuitable for use as pistons for internal combustion engines (including diesel engines).” Reply Br. 2. Appellants also argue that in view of the alleged teaching away by Rasmussen, the combination of references is athwart the requirements for establishing a prima facie case of obviousness. *Id.* at 3–5.

We are not persuaded by Appellants’ arguments that the Examiner reversibly erred in rejecting claim 1 for the reasons stated by the Examiner in the Final Rejection and in the Answer. We add the following primarily for emphasis.

The Examiner's finding that "Rasmussen teaches investment casting of a diesel engine piston wherein both the crown and skirt are cast with minimal finish manufacturing tolerances (i.e., the crown is cast to zero net size finished)" is supported by the record. Final Act. 5; Rasmussen ¶ 49. Appellants do not dispute the Examiner's finding that investment casting can be equated to the claimed sand casting. Ans. 3 ("investment casting, as known to those in the art, involves repeatedly coating a pattern with sand to form the mold cavity."). Nor do Appellants dispute the Examiner's finding that the references Ozawa, Grassi, Buschkamp, and Rasmussen relate to sand casting overall.

Appellants' argument that Rasmussen "teaches away from the claimed material of choice (aluminum)" (Reply Br. 3) is unpersuasive because Rasmussen acknowledges that aluminum has been the standard for internal combustion pistons for over 60 years (Rasmussen ¶ 15) and the Examiner relies on Ozawa for teaching an aluminum-based diesel piston (Final Act. 3), not Rasmussen. Moreover, Appellants do not direct us to any evidence that Rasmussen either discourages or disparages the use of sand casting to form an aluminum-based piston. Rather, the cited paragraphs of Rasmussen describe the "unsatisfactory characteristics" of "heat resistant alloys" and "[c]ast or forged aluminum or aluminum alloy pistons with cast in place ferrous inserts for ring grooves and piston tops/combustion cavities" as, first, "costly", "difficult to forge or case", "prematurely fail in service", and "eventually erodes or loses necessary thermal strength." Rasmussen ¶¶ 16–20. It is undisputed that Rasmussen goes on to promote the advantages of investment or sand casting in paragraph 49. A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or

would be led in a direction divergent from the path that was taken by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). The record in this case supports the Examiner's finding that the disadvantages noted by Rasmussen do not teach away from casting because Rasmussen does not teach failure during casting. Ans. 3. Furthermore, Rasmussen also discloses the advantages of the sand casting method. Rasmussen ¶ 49. In addition, it is insufficient to establish a teaching away based on alternative material being more costly. *See In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983) ("additional expense associated with the addition of inhibitors would not discourage one of ordinary skill in the art"); *Orthopedic Equipment Co. v. United States*, 702 F.2d 1005, 1013 (Fed. Cir. 1983).

In sum, we do not find the Appellants' arguments persuasive to justify a reversal of the Examiner's rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (requiring appellant to identify the alleged error in the examiner's rejections). Accordingly, we affirm the Examiner's rejection of claim 1 as obvious over the combination of Ozawa, Grassi, Buschkamp, and Rasmussen.

CONCLUSION

We affirm the Examiner's rejections of claims 1–18 as obvious under 35 U.S.C. § 103(a).

DECISION

The Examiner's decision is affirmed.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

Appeal 2016-002875
Application 13/609,821

AFFIRMED